

PulseForge® Soldering on Low Temperature Substrates: Enabling Flexible Hybrid Electronics

Rev: 11.19.1

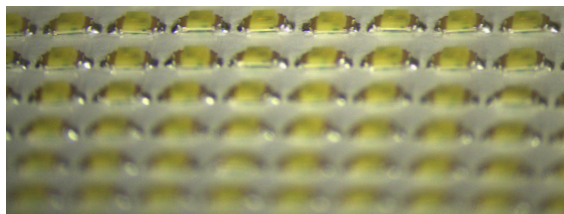
PulseForge® Soldering: A technology partnership between NovaCentrix and the Holst Centre. PulseForge® Soldering enables the soldering of standard lead-free solder pastes on low-cost, temperature sensitive substrates such as paper and PEN in milliseconds.

HOW IT WORKS

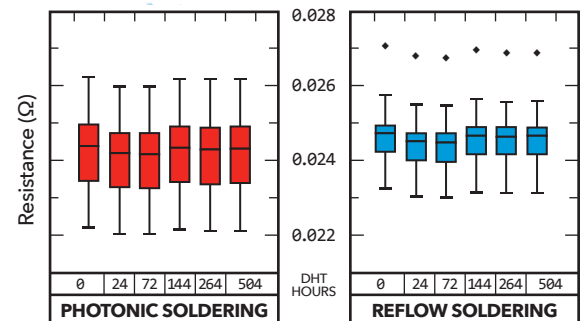
- Pulses of high intensity light are used in place of a reflow oven to heat the solder to its liquidus temperature in milliseconds without damaging the underlying substrate
- Solder paste is heated indirectly through a light-absorbing layer and components
- High contrast ratio absorption between layers allows for selective heating
- High energy doses can be applied without damaging conductive tracks by protecting them with light-reflecting layers

HOW IT IS BETTER

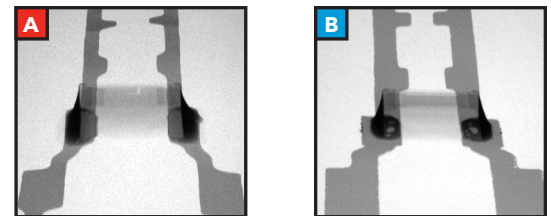
- Facilitates soldering on to low cost, flexible, thermally sensitive substrates, including PET, PEN, paper, TPU, and fabric
- Works with conventional lead-free solders, such as SAC 305
- Simultaneously solders commercial electronic packages over a wide area
- **Orders of magnitude** faster than conventional reflow processes making it R2R compatible



Large array of LEDs soldered on to PET substrate. Modularity of the PulseForge family of tools allows quick scale up and integration into existing production lines.



Results of reliability tests over time for soldered surface mounted resistors inside 85°C/85% relative humidity chamber.



X-ray imaging of soldered samples done through (A) PulseForge soldering vs (B) conventional soldering shows similar fillet shapes but considerably lesser void formation in the PulseForge soldered samples. PulseForge soldering was done in 5 seconds while reflow soldering was done over the few minutes time scale.